

**A Distortion-Managed Digital RF Communications Transmitter
and Method Therefor**

Abstract of the Disclosure

5 A digital communications transmitter (100) includes a digital linear-and-nonlinear predistortion section (200) to compensate for linear and nonlinear distortion introduced by transmitter-analog components (120). A direct-digital-downconversion section (300) generates a complex digital
10 return-data stream (254) from the analog components (120) without introducing quadrature imbalance. A relatively low resolution exhibited by the return-data stream (254) is effectively increased through arithmetic processing. Linear distortion is first compensated using adaptive techniques with
15 an equalizer (246) positioned in the forward-data stream (112). Nonlinear distortion is then compensated using adaptive techniques with a plurality of equalizers (226) that filter a plurality of orthogonal, higher-ordered-basis functions (214) generated from the forward-data stream (112). The filtered-
20 basis functions are combined together and subtracted from the forward-data stream (112).